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Application Serial No. 10/539,731
Reply to office action of December 26, 2007

PATENT
Docket: CU-4274

Amendments To The Claims

The listing of claims presented below will replace all prior versions, and listings, of claims in the application.

Listing of claims:

1. (currently amended) A protocol embodying system converting user data into IP packets and converting IP packets into user data, the protocol embodying system in ~~[[the]]~~ GGSN including a GPRS (general packet radio service) network which includes protocols of first and second network layers, and a protocol of a transfer layer wherein ~~respective protocols of a transfer layer and the GPRS tunneling, and converts user data into IP packets and IP packets into user data; and a PDN (public data network) [[which]] is connected to the GPRS network [[, and]] in which the PDN uses the protocols of the first and second layers to transmit the IP packets to the outside or the GPRS network, the protocol embodying system~~ comprising:

an IP layer~~[[,]]~~ provided between the GPRS network and the PDN, for performing routing between the two networks, and performing routing between the protocols of the first and second network layers and the transfer layer protocol on the GPRS network~~[[, and]]~~ ;

a GPRS tunneling protocol unit (GTP-U) converting back and forth the IP packets into tunnel messages using a GPRS tunneling protocol; and

a virtual driver provided on the lower part of the IP layer for performing routing

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of IP packets back and forth to the PDN via the IP layer and [[.]] performing routing IP packets back and forth ~~connected to the protocol of the~~ GPRS tunneling protocol unit from the virtual driver wherein the virtual driver is provided to the ~~upper part of the IP layer on the GPRS network, and~~ operable as the lower interface of the IP layer.

2. (original) The protocol embodying system of claim 1, wherein the virtual driver is connected to the IP layer so that the IP packets are output to the PDN through the protocols of the first and second layers of the PDN when the data transmitted from the GPRS network are passed through the protocols of the first and second network layers and converted into the IP packets through the IP layer, the transfer layer, and the GPRS tunneling.

3. (original) The protocol embodying system of claim 1, wherein the virtual driver is connected to the IP layer so that the IP packets are output to the GPRS network through the tunneling protocol of the GPRS network, the transfer protocol, the IP layer, and the protocols of the first and second layers when the IP packets transmitted from the PDN are transmitted to the IP layer through the protocols of the first and second layers.

4. (original) The protocol embodying system of claim 1, wherein the virtual driver performs a reporting process with the IP in advance in order to process the dynamic and static addresses of the mobile stations belonging to the GGSN during the process

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of transmitting the IP packets provided from the PDN to the GPRS network.

5. (currently amended) A protocol embodying method in the GGSN converting user data into IP packets and converting IP packets into user data, comprising:

[[a)] when receiving a first data unit ~~a packet~~ at a GGSN from a GPRS network, transforming the first data unit into first tunneled message, and transmitting [[a)] the first tunneled message ~~tunneled through using~~ protocols of first and second layers of the GPRS network to an IP layer, allowing tunneling of the first tunneled message to be canceled at a GPRS tunneling protocol ~~through using a~~ protocol of a transfer layer so that a first IP packet from the first tunneled message to be directed to a virtual driver is generated according to routing of the IP, and generating an IP packet;

[[b)] transmitting the first IP packet ~~generated in (a)~~ to the IP layer through [[a)] the virtual driver, and allowing the IP layer to transmit the first IP packet to a corresponding node on ~~[[the]]~~ a public data network (PDN); and

[[c)] allowing the PDN to output the received first IP packet which has received the IP packet in (b) to output the IP packet to the outside through protocols of the first and second layers.

6. (currently amended) A protocol embodying method in ~~[[the]]~~ a GGSN converting user data into IP packets and converting the IP packets into user data, comprising:

[[a)] when receiving an IP packet at [[a)] the GGSN from a PDN (public data

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network), ~~transmitting~~ emitting the IP packet to an IP layer through protocols of first and second layers;

[[b)]] transmitting the emitted IP packet ~~transmitted to the IP in (a)~~ to a virtual driver, and allowing the virtual driver to transmit the emitted IP packet to a GPRS tunneling protocol of the GPRS network; and

[[c)]] converting the transmitted IP packet ~~transmitted to the GPRS tunneling protocol in (b)~~ into a tunneled message, and outputting the tunneled message to the GPRS network through a transfer layer protocol, the IP layer, and protocols of the first and second layers,

wherein the tunneled message is converted into user data through the transfer layer, the IP layer, and the protocols of the first and second layers.

7. **(currently amended)** The protocol embodying method of claim 6, wherein the step of allowing the virtual driver to transmit the IP packet to the IP layer in (b) comprises performing a reporting process with the IP layer in advance so that the virtual driver may process dynamic and static addresses of mobile stations belonging to the GGSN.

8. **(new)** The protocol embodying method of claim 5 further comprising:
allowing the virtual driver to perform routing of a second IP packet from the outside to the protocol of the transfer layer;
converting the second IP packet into a second tunneled message using the protocol of the transfer layer and transferring the second tunneled message

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through the IP layer to the GPRS network; and

transforming the converted second tunneled message into a second data unit using the GPRS network.

9. (new) The protocol embodying method of claim 6 further comprising:

when acquiring another user data at the GGSN from the GPRS network, sending out another message by tunneling the another user data into the another message using protocols of first and second network layers of the GPRS to the IP layer, allowing tunneling of the another tunneled message to be canceled at the GPRS tunneling protocol through the transfer layer protocol to generate another IP packet to be directed to the virtual driver and routing the another IP packet to the IP layer with the virtual driver; and

transmitting the another IP packet to the IP layer using the virtual driver, and allowing the IP layer to transmit the another IP packet to a corresponding node on PDN.